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July 29, 1993

Ms. Donna Searcy
Secretary of Federal
Communications Commission
1919 M Street, NW
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RE: Amendment of Rules For Automatic Vehicle Monitoring Systems - PR Docket No. 93-61

Dear Ms. Searcy:

Transmitted herewith on behalf of Mark IV Industries, Ltd., I.V.H.S. Division, are an original and nine copies of its reply comments in response to the Commission's Notice of Proposed Rulemaking released April 9, 1993, as corrected by Erratum released May 5, 1993 in the above-captioned proceeding.

In the event that there are any questions concerning this matter, please communicate with the undersigned.

Very truly yours,

George Y. Wheeler

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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| In the Matter of | ) | |
| | ) | |
| Amendment of Part 90 of the | ) | PR Docket No. 93-61 |
| Commission's Rules to Adopt | ) | |
| Regulations for Automatic | ) | RM No. 8013 |
| Vehicle Monitoring Systems | ) | |

TO: The Commission

# REPLY COMMENTS

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July 29, 1993

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## SUMMARY

Mark IV supports adoption of the Commission's proposals with modifications to accommodate innovative AVM/AVI technologies in terms of bandwidth, modulation, coverage and workable procedures for avoiding interference conflicts. Mark IV recognizes that a viable band plan which provides maximum service to the public must be devised, and that all parties must strive to be as efficient as possible in their use of spectrum. We have therefore suggested a number of compromises which, while they fall short of what would be ideal for any of the parties, achieves the above goal, and encourages spectral efficiency. We would prefer to see a greater degree of protection afforded to short-range systems, and in this light support the proposal of the InterAgency Group for co-primary status and blanket licensing. We have been persuaded by the Comments that the shared spectrum approach is suitable for short-range AVI operations and have suggested adoption of frequency coordination procedures and technical limitations upon field strength to implement this approach. We oppose adoption of the Southwestern Bell proposals to expand the permissible uses of wide-area systems. We also oppose the proposals of Radian to authorize wind profiler systems at 915 MHz and of AMTECH/Pinpoint to increase the maximum ERP of wide-area systems to 5 KW.

Before the
FEDERAL COMMUNICATIONS COMMISSION
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TO: The Commission

## REPLY COMMENTS

Mark IV Industries, Ltd., I.V.H.S. Division ("Mark IV"), herewith, by its attorneys, files its reply comments in response to the Commission's Notice of Proposed Rulemaking in the above-captioned docket.

Numerous commenters have observed that the fundamental operating characteristic which differentiates the Automatic Vehicle Monitoring ("AVM") and Automatic Vehicle Identification ("AVI")[1] technologies for regulatory purposes is the range or coverage area which each type of system is designed to serve.[2] We made this point in our comments that AVM systems

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[1] The abbreviated names of parties filing the comments referenced in these Reply Comments are included in the attached Certificate of Service beside the full name of that party.

[2] AT&T Comments, pp. 6-8, Amtech Comments, p. 2 (Fn.3), IVHS America Comments, p. 10, Hughes Comments, p. 6-7, Lockheed Comments, p. 3, Pinpoint Comments, p. 1 (Fn. 3), InterAgency Group Comments, pp. 7-8.

using pulse-ranging multilateration techniques are designed to serve wide areas, whereas short-range AVI systems, such as the Mark IV system, are designed to serve highly localized areas for Vehicle to Roadside Communications ("VRC"). We believe that the most effective and orderly approach to spectrum administration in the 902-928 MHz band must address the different technical and other attributes of "short-range" AVI systems and "wide-area" AVM systems.

The record in this proceeding makes clear that both short-range and wide area systems will be sharing the 902-928 MHz band with ISM and Government systems plus a proliferation of Part 15 non-licensed systems and amateur radio operations. The interference environment is likely to become a complex mixture of systems employing different technologies, power levels, emissions and frequencies. The highly spectrum efficient design of the Mark IV system including superior non-interference characteristics, low intensity of radiated emissions, extremely confined coverage design and high data rates to support numerous service applications makes it an excellent candidate for operations in this band.

The record also confirms that a variety of short-range technologies are being deployed using 902-928 MHz frequencies in

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[2](...continued)
Comments, p. 3, Pinpoint Comments, p. 1 (Fn. 3), InterAgency Group Comments, pp. 7-8.

addition to short-range backscatter type systems. Using high data rate active and semi-active technology with time multiplexing, these other technologies are capable of operation in an unlimited number of highway lanes (or other types of detection points) with a single 6 MHz channel.

Mark IV, Hughes, and AT&T are currently manufacturing, and supplying products which make use of semi-active technology. These systems are currently in operation or being deployed in a variety of locations throughout the United States. These include:

The Orlando-Orange County Expressway Authority, Florida.

The Transportation Corridor Agencies, Orange County, in California.

Grant Oliver Corporation operating landside systems for the Greater Pittsburgh Airport, Pennsylvania.

The Heavy Vehicle Electronic License Plate (HELP) program including installations in 120 lanes at 30 sites in 8 states along the Interstate 10 and Interstate 5 corridors.

The I-75 Mainline sorting project in six states along the Interstate 75 corridor.

The active transponder technology used in the HELP Program was supplied by Mark IV. In a second corridor, the I-75 corridor, active short-range technology supplied by Hughes is being deployed.

Furthermore, the foregoing two corridors are compatible with each other. The current effort by the USDOT (FHWA) to develop a National Standard is focused on the Commercial Vehicle Operations ("CVO") application. Any standard which is established for CVO operations will likely be compatible with the technology in these two corridors, in which millions of public dollars in hardware, software, and construction have been invested. Furthermore, such systems have involved significant international coordination to ensure compatibility with cross border traffic into Canada, where corresponding installations are harmonized and compatible with the U.S. corridors. These existing and planned installations can also be easily upgraded or installed, without any loss of functionality or multi-lane capability, to standards which comply with the basic plan outlined in the AVM NPRM.[3]

## Recommendations

Our original recommendations filed in our Comments were intended to protect access to useable spectrum in the 902-928 MHz band for all existing and authorized technologies and facilities. We still believe that this goal can be achieved by adopting rules

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[3] The Caltran specification referred to by some commenters has been established for the purpose of Electronic Toll Collection only, and only in the State of California. To our knowledge, no system complying with these specifications has been deployed or even demonstrated. Furthermore, the State of California participates in the HELP program, which is the only currently operating Commercial Vehicle Operations corridor in the United States.

and policies which encourage the development and implementation of spectrum efficient technologies.

The Commission's permanent AVM/AVI rules should be flexible enough to accommodate the innovative technologies developed by Mark IV and others in terms of (1) bandwidth, (2) modulation characteristics, (3) access to adequate spectrum, (4) reasonable service area coverage, and (5) workable procedures for avoiding interference conflicts.

We and many other commenters have made proposals to accomplish the objectives listed here. In the following sections of these reply comments we discuss the positions of other commenters. In some cases, we believe that the recommendations of others, while well-intentioned, may be unnecessary or counterproductive to the healthy growth of AVM/AVI technologies. In other cases, we have been persuaded that the recommendations of others warrant our support and that they are suitable alternatives for some of our original recommendations. As explained here, we have attempted to improve our original recommendations to accommodate the needs of as wide and diverse a group of Part 90, Part 15 and amateur radio uses in the 902-928 MHz band as reasonable spectrum management procedures will permit.

## Discussion

### 1. Mark IV Joins With Many Other Commenters Supporting Expanded Access For AVI Systems To The 912-918 MHz Band.

Numerous commenters including Mark IV, Lockheed, IVHS America, Hughes, MFS/TI, AMTECH, Pinpoint, InterAgency Group, and CALTRANS support the expanded use of the 912-918 MHz band for implementation of short-range operations. Mark IV systems are frequency agile so that implementation of Mark IV's spectrum efficient technologies can be accomplished without significant delay. The Commission should adopt its initiatives to obtain authorization from NTIA to use this additional spectrum for short-range systems, including those of Mark IV which employ greater than 2 MHz bandwidth.

### 2. Mark IV Supports The Proposal Of The InterAgency Group To Assign Co-Primary Status And To Adopt Blanket-Licensing For ETTM And Other Public Service Licensees.

We strongly support the needs of public service users such as the InterAgency Group members to receive co-primary status vis-a-vis "other licensed users of Part 90 frequencies" to protect their IVHS facilities from displacement or interruption.[4] We also support The InterAgency Group's related

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[4] InterAgency Group Comments, pp. 11-12.

request for blanket-licensing of multi-jurisdictional or regional ETTM and other public service IVHS systems. The needs of these licensees should be given special consideration in these proceedings because of the widespread public benefits from the operations of such systems in promoting highway and vehicle safety, reducing roadway congestion, enhancing economic productivity and increasing energy efficient transportation.

We realize that grant of the co-primary status to ETTM and other public service licensees is not consistent with the exclusive use of the 904-912 MHz and 918-926 MHz bands proposed by Teletrac, Mobilevision, Southwestern Bell and Location. In our Comments, we proposed that if the Commission gave wide-area system licensees exclusive use of these bands, short-range systems should be permitted to share these bands on a secondary basis, subject to non-interference to wide-area systems. We thought this was a reasonable solution because we expected that Mark IV systems would routinely be licensed in the 912-918 MHz band so that the occasions for use of the 904-912 MHz and 918-926 MHz bands would be relatively infrequent and because in our experience the short-range systems of Mark IV have not caused harmful interference to wide-area systems. On balance, while we still believe that such co-channel sharing is feasible on a non-interference basis, we also believe that the needs of ETTM and other public service licensees are such that their short-range systems should be given protection from system displacement or

interruption and that their needs must be paramount in the Commission's determinations if there is inadequate available spectrum elsewhere in the 902-928 MHz band. Co-primary status for this limited group of licensees with the licensees of wide-area systems is an effective means to assure these needs are met.

### 3. Mark IV Agrees With The Commenters Supporting Spectrum Sharing As The Proposed Basis For Short-Range System Licensing.

Contrary to the position taken in our Comments, we are now persuaded that the spectrum sharing proposed by the InterAgency Group and others is a reasonable and workable solution to system licensing which can be implemented to meet all of the five objectives listed above which we believe should guide the Commission's decision making.

Specifically, we recommend that the Commission implement frequency coordination procedures for all short-range systems to promote the most effective spectrum sharing. There are many examples of radio services under Part 90 of the Commission's rules in which applicants select frequencies through the use of a frequency coordinator. See Section 90.175 of the Commission's rules. The record here already demonstrates the anticipated proliferation of short-range systems which frequency coordination procedures are designed to address. As the Commission has found in other proceedings, the frequency coordination approach will

"...result in more tailored and therefore, more efficient use of the spectrum allocated."[5] The benefits include flexible assignments to permit applicants to accommodate their needs to a particular service application and capability to engineer systems based upon specific circumstances and needs. As in other radio services where frequency coordination is now used, these benefits are especially significant in congested urban areas where systems can be designed to be closely spaced so that a maximum number of users can be served.

If the Commission adopts the frequency coordination approach recommended here, there will still be a need for the Commission to set field strength (and maximum output power/antenna height) limitations for short-range (and wide-area) systems to provide a technical framework for shared spectrum uses. These technical issues are discussed in our Comments and in a subsequent section of these Reply Comments. We also strongly recommend that the Commission continue to scrutinize channel selections under frequency coordination to see that spectrum efficient uses of the available bandwidth and that the Commission reemphasize that all licensees are responsible for cooperating in the selection and use of frequencies to reduce interference and to make effective use of available spectrum.

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[5] Second Report and Order, Gen Dkt. No. 80-183, 91 FCC 2nd 1214,1225 (1982)

Regarding the choice of frequency coordinators, NABER has filed comments indicating its capabilities and availability to perform frequency coordination in the 902-928 MHz band. Clearly, if the Commission is disposed to adopt our frequency coordination approach, an organization with the stature and experience of NABER would be an excellent candidate. The Commission might also consider other organizations including the American Association of State Highway and Transportation Officials which is the designated frequency coordinator for the Highway Maintenance Radio Service. See Section 90.23 of the Commission's rules. This organization also has significant experience in the frequency coordination and a longstanding commitment to the development, operation and maintenance of the national transportation system. We express no opinion about the relative merits of these organizations except that they both should be considered.

4. Mark IV Opposes The Expansion Of Permissible Uses Proposed By Southwestern Bell.

Southwestern Bell's proposal to give wide-area system licensees the "broadest possible latitude to provide services which the public wants,"[6] is an unnecessary and counterproductive conversion of spectrum allocated for wide-area AVM uses to other "commercial mobile" uses. Apart from the bare

[6] Southwestern Bell Comments, p. 5

assertion that Southwestern Bell would like to make this change and that it could probably sell service to the public, particularly as an add-on to its cellular radio capabilities, no justification is offered in support of this substantial change in the Commission's rules. The Commission is currently proposing to expand 800 MHz and 900 MHz SMR capabilities, has recently allocated 900 MHz spectrum for narrowband PCS operations and will soon be acting on broadband PCS allocations. If there is a pressing need for additional "communications" services which cannot be met on spectrum specifically allocated for such uses, Southwestern Bell should be compelled to make the case on the record here. In our view, it does not advance the public benefits available from AVM/AVI technologies to encourage the conversion of frequencies of 902-928 MHz band to pseudo cellular, SMR, narrowband PCS or even broadband PCS operations.

We agree with the comments of IVHS America that the Commission should assign a higher spectrum access priority to vehicular-based monitoring and identification services than more general location and monitoring functions.[7] The demand for vehicular-based uses is indeed substantial and growing. The public interest would not be served if valuable spectrum specifically intended to support IVHS operations is diverted to other uses.

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[7] IVHS America Comments, p. 16

5. Non-Government Wind Profiler Systems Should Not Be Authorized At 915 Mhz (with 12.5 MHz Bandwidth).

Mark IV has filed comments and reply comments in PR Docket No. 93-59 describing the potentially destructive impact of wind profiler caused interference to co-channel short-range systems operating in the 912-918 MHz band. Such interference would cripple the deployment of these technologies. Unless regulatory safeguards are adopted to protect the licensees of short-range IVHS systems, crucial public services like electronic toll collection and traffic management could be impaired or disrupted. In the event the Commission is prepared to authorize wind profiler operations at 915 MHz (with 12.5 MHz bandwidth) provision would need to be made for alternative sub-bands, 902-928 MHz and 922-928 MHz, to accommodate wideband short-range systems like those of Mark IV.

6. Adoption Of Certain Proposals Of AMTECH And Pinpoint Will Impair Or Preclude Effective Spectrum Sharing.

We proposed to supplement, clarify or replace specific elements of the Commission's technical proposals to promote spectrum efficient use of the 902-928 Mhz band for short-range systems.

a. Antenna Height/Power Limits

The proposals of AMTECH and Pinpoint to authorize wide-area systems in the 904-912 MHz and 918-926 MHz bands to operate with up to 5 KW ERP should not be adopted. Such power output would render these portions of the 902-928 MHz band unusable for secondary short-range applications as proposed by Mark IV. The Commission should not depart from its originally proposed limit of 300 watts ERP for wide-area systems.

b. Field Strength Limitations.

As indicated in our Comments, Mark IV does not believe the use of height/power restrictions are appropriate as applied to short-range systems, since unconventional antenna designs and mounting configurations are often used. The Commission's proposed power limits do provide some flexibility for these unconventional installations, however, we believe that the interference potential of short range systems can be better controlled by the use of field strength limitations of emissions towards the horizon. Based upon our review of the Comments, field strength limits of 10 mV per meter at 1000 meters at a 5 meter height would be reasonable and workable. In view of the fact that unlicensed transmitters are permitted to operate up to 1 watt in this band, such a restriction would provide a stable interference environment for short-range system designs,

similar to that potentially created by the presence of the Part 15 devices. As a result, the effective use of the band will be maximized.

## 7. The Commission Should Preserve Existing Rules And Policies Affording Part 15 Device And Amateur Operations Access To The 902-928 MHz Band.

We support adoption of rules and policies which will continue to provide access to the 902-928 MHz band for the operations of Part 15 devices and amateur radio licensees. We agree with the recommendations of the Coalition, EIA/CEG, Interdigital and others that a joint technical dialogue regarding interference uses should be established. It is not necessary to reduce authorized power or banish Part 15 devices from all or some portion of the 902-928 MHz band as proposed by Ericsson and Southwestern. Likewise it is unnecessary and counterproductive to shift AVM/AVI uses to another band or to confine such uses to limited portions of the 902-928 MHz band as proposed by Telxon and Uniden. We believe that the needs of all authorized user groups, including Part 15 users and amateur operations, can be met with available spectrum if the participants have strong incentives to implement spectrum efficient technologies and to work together cooperatively to resolve potential interference cases.

## Conclusion

We request that the Commission make possible the rapid and effective deployment of AVM/AVI technologies for IVHS service by adopting permanent AVM/AVI rules. The public benefits from the IVHS products and services are well documented in the comments of many parties, particularly IVHS America, a public/private partnership comprised of federal, state and local government, private industry and members of the academic community.[8] We believe this can be best accomplished by emphasizing in the Commission's rules and policies incentives to promote use of spectrum efficient technologies which meet the needs of the broadest possible combination of existing and authorized user groups in the 902-928 MHz band.

Respectfully submitted,

MARK IV IVHS DIVISION

/s/ George Y. Wheeler
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July 29, 1993

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[8] IVHS America Comments, pp. 2-7.

CERTIFICATE OF SERVICE

I, Abbie Weiner, a secretary in the law firm of Koteen & Naftalin, do hereby certify that a copy of the foregoing "Reply Comments of Mark IV IVHS Division" was sent by first class U.S. mail, postage prepaid, on this 29th day of July, 1993, to the offices of the following:

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